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(71) Applicant: **MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
1006, Oaza Kadoma
Kadoma-shi, Osaka-fu, 571(JP)

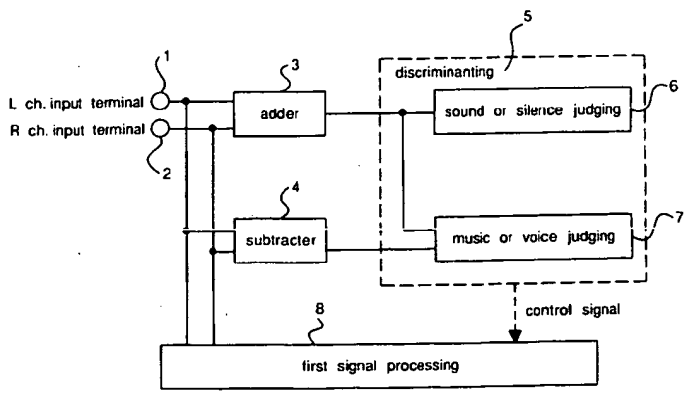
(72) Inventor: **Serikawa, Mitsuhiko**
7-204, 1-7, Takasu-cho
Nishinomiya-shi, Hyogo-ken(JP)
Inventor: **Kawamura, Akihisa**
1-18-21-504, Higashinakaburi
Hirakata-shi, Osaka-fu(JP)
Inventor: **Matsumoto, Masaharu**
6-3-103, Myokenzaka
Katano-shi, Osaka-fu(JP)
Inventor: **Numazu, Hiroko**
5-22-206, Kakiuchi-cho
Kadoma-shi, Osaka-fu(JP)

(74) Representative: **Eisenführ, Speiser & Partner**
Martinistrasse 24
W-2800 Bremen 1(DE)

(54) Music/voice discriminating apparatus.

(57) A music/voice discriminating apparatus is composed of a signal processing portion for effecting the signal processing upon input acoustic signals, a music/voice deciding portion for discriminating whether or not the input acoustic signals are music or voice, a first signal processing portion for setting acoustic parameters for the signal processing optimum respectively for music or voice, a second signal processing portion for controlling the acoustic parameters of the first signal processing portion in accordance with the decision results of the music/voice deciding portion so that it may become a desirable value set in the second parameter setting portion.

Fig. 1



EP 0 517 233 A1

BACKGROUND OF THE INVENTION

The present invention generally relates to a music/voice discriminating apparatus and a music/voice processing apparatus which can be used for sound field control related appliances where an expanding feeling, an orientation feeling, an articulation feeling, can be realized, better in accordance with a type of sources to be reproduced in an audition room, and within a compartment.

In recent years, a technical tendency is changing from the fundamental tone reproduction to the fundamental sound field reproduction in a acoustical field. A field control apparatus for realizing such sound fields as those of a concert hall or the like is being developed, in fields of home audio, car audio and so on, sound field control apparatuses for reproducing with a speaker of a multichannel with effect sounds such as initial reflection sounds and reverberation sounds and so on being added to inputted acoustical signals. Some of them have a source discriminating function, which can automatically adjust in a maximum value the level of the effect sounds in accordance with the source type (for example, Japanese Patent Laid-Open Publication No. 64-5200).

As one example of the above described conventional source discriminating function, the size of the difference signal amplitude of the L, R two channels signals to be stereo-transmitted is calculated so as to set the level of the effect sound for inverse proportion to it. Namely, in a case of source less in reverberation component at the music reproducing time, effect sounds are added more as the difference signal amplitude becomes small. In the reverse case, the effect sounds are added less.

In the conventional construction, in changes from stereo music broadcast to a monoral voice such as news or the like at, for example, FM broadcasting reception time, the difference signal of L, R signals becomes almost zero and is judged as dry music with the reverberation components being extremely less. The added effect sounds become maximum in level, with a problem that the speech intelligibility being lowered.

At the stereo music reproduction time, the amplitude values of L, R difference signals are normally varied by each part at a silence time among music, each part in music, input signal level and so on, with a problem that the effect sound level violently varies in a piece of music, thus resulting in unnatural.

SUMMARY OF THE INVENTION

Accordingly, the present invention has been developed with a view to substantially eliminating the above discussed drawbacks inherent in the prior art, and for its essential object to provide an improved music/voice discriminating apparatus.

Another important object of the present invention is to provide an improved music/voice discriminating apparatus, which can judge with high accuracy whether or not inputted acoustical signals are a music or a voice including the discrimination in a sound condition or a silence condition.

In accomplishing these and other objects, according to one preferred embodiment of the present invention, there is provided a music/voice discriminating apparatus which includes an adding portion for adding L, R stereo signals to be inputted, a subtracting portion for subtracting, a discriminating portion. The discriminating portion is composed of a sound/silent judging portion whether the inputted L, R signals are a sound or a silent, and a music/voice judging portion composed of a music comparing portion for judging whether or not the input signals are a music, and a voice comparing portion for judging whether or not the inputted signals are a voice in a case of the sound having been inputted.

The present invention judges that it is a silence when the amplification values of the adding signals of the L, R are a constant value or lower given previously in, first, the sound/silent judging portion under the above described construction so that the judgment of the music/voice is not effected. In a case of the voiced sound, it is decided as music when the amplitude ratio of the difference signal of L, R and the sum signal of L, R is a constant value or more for the music decision use set in advance in a music comparing portion and a voice comparing portion for constituting a music/voice deciding portion so as to decide it as voice when the ratio is a constant value or lower for voice decision use or to reserve the judgement of the music/voice when it is not applied to both of the above description.

Therefore, unnecessary processing content change can be avoided at a silence time in processing operation and so on in accordance with the type of the input signals. At the voice time, the proper signal processing content change can be instructed only when a music or a voice can be positively judged. When a music or a voice cannot be judged, the processing content change in the wrong direction can be avoided by the maintenance of the processing contents as they are. Uncertain factors to be caused by variations of the L, R signal components with, a portion of the voice or the music and by changes in sound volume, disturbance noises and so on are removed so as to effect the positive judgment of the music/voice. Further, the stable acoustic signal processing operation can be effected with the use of the decision

results.

Another object of the present invention is to provide a music/voice processing apparatus which is capable of optimum, stable sound field reproduction in accordance with the input source by the gradual control where necessary acoustic parameters are brought little by little to the optimum value in accordance with the judgment result as to whether the acoustic signal inputted is a sound or a silence, and whether it is music or voice in the case of sound.

In accomplishing these and other objects, according to one preferred embodiment of the present invention, there is provided a music/voice processing apparatus which includes a signal processing portion for effecting the signal processing upon inputted acoustic signals, a music/voice deciding portion which continuously or discretely keeps deciding whether or not the input acoustic signals are a music or a voice, silent under the input acoustic signals, a parameter control portion for variably controlling acoustic parameters so as to effect the acoustic signal processing in the above described signal processing in accordance with the decision results of the above described music/voice deciding portion, a parameter setting portion for setting on the above described parameter control portion values optimum previously to the voice, values optimum previously to the music as the acoustic parameter values.

The present invention corrects the existing state of acoustic parameters little by little so that the existing state of acoustic parameters may get closer to optimum values in the music when they have been decided as music, or to optimum values in the voice when they have been decided as voice in the signal processing portion in accordance with the continuous or discrete decision results in the music/voice deciding portion in the above described construction, and does not correct the existing state of acoustic parameters when they have been decided as the silence condition. In the music/voice deciding portion, the judging reference of music and voice is strictly set so as to avoid the error decision as clear as possible, and the existing state of acoustic parameters are not corrected even when they are not decided as music/voice although the condition is a sound condition.

By doing a gradual correction little by little of the acoustic parameters together with the strict decision of the music or voice, the influences may be prevented to minimum if error judgment is caused with a probability ratio, so that stable audition can be effected in sound quality, sound field suitable respectively for music or voice. When they cannot be decided as music or voice although the condition is sound, the correction of the acoustic parameters is reserved so as to retain the existing state, so that the acoustic parameter change in the wrong direction can be avoided, thus contributing towards the stable audition.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the present invention will become apparent from the following description taken in conjunction with the preferred embodiment thereof with reference to the accompanying drawings, in which;

Fig. 1 is a block diagram showing one construction example of a music/voice discriminating apparatus of the present invention;

Fig. 2 is a flow chart showing a discriminating algorithm in a discriminating portion which is components of the music/voice discriminating apparatus of the present invention;

Fig. 3 is a block diagram showing one construction example of a music/voice processing apparatus of the present invention;

Fig. 4 is a a block diagram showing an inner construction of a music/voice deciding portion which is construction elements of a music/voice processing apparatus of the present invention;

Fig. 5 is a flow chart showing a deciding step in a music/voice deciding portion which is the components of the music/voice processing apparatus of the present invention; and

Fig. 6 is an algorithm of sound volume control as one example of an acoustic parameter control in a parameter control portion which is the components of the music/voice processing apparatus of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Before the description of the present invention proceeds, it is to be noted that like parts are designated by like reference numerals throughout the accompanying drawings.

Referring now to the drawings, there is shown in Fig. 1, a music/voice discriminating apparatus according to one preferred embodiment of the present invention, which includes a L channel input terminal 1, and a R channel input terminal 2 each receiving stereo signals to be transferred from a signal source of FM tuner or the like, an adding portion 3 for adding the inputted L signal and R signal, a subtracting portion 4 for subtracting the inputted L signal and R signal to have a resultant of 1L-R1, a first sound/silence judging portion 6 for deciding whether the input signals are sound or silence in accordance with the L, R sum signals from the adding portion 3, a music/voice deciding portion 7 for deciding whether the input signals are music or voice in accordance with the L, R sum signals and the L, R difference signals from the

adding portion 3 and the subtracting portion 4, a discriminating portion 5 composed of the first sound/silence judging portion 6 and the music/voice judging portion 7, a first signal processing portion 8 for effecting an acoustic signal processing operation suitable for music or voice in accordance with the control signal transferred from the discriminating portion 5.

A music/voice discriminating apparatus constructed as described hereinabove in one embodiment of the present invention will be described hereinafter in its operation.

In Fig. 1, acoustic signals inputted from the L channel input terminal 1 and R channel input terminal 2 are added and subtracted respectively in the adding portion 3 and the subtracting portion 4, and are transferred to a discriminating portion 5. In the discriminating portion 5, it is judged whether inputted acoustic signals are sound or silence in accordance with the step to be described in detail in Fig. 2, and, then, in the case of judging the sound, whether they are music or voiced so as to transfer the discrimination results to the first signal processing portion 8 as the control signal. In the first signal processing portion 8, the L, R signals inputted to the L channel input terminal I and the R channel input terminal 2 are received. When they have been decided as music in accordance with the control signal from the discriminating portion 5, the signal processing suitable for the music is effected is the first signal processing poriton 8, while, when they have been decided as the voice, the signal processing suitable for voice is effected. When it has been decided as a silent or when the discrimination of the music/voice cannot be positively effected even at the sound time, the existing state of signal processing is retained so as to avoid the danger in the processing content change in the wrong direction.

In Fig. 2, the music/voice judging portion 7 is composed of a music comparing portion 9 for deciding whether or not the input signal is music in accordance with the comparison between the amplitude ratio of the L, R difference signals (1L-R1) and L, R sum signals (1L + R1), and a set constant value, a voice comparing portion 10 for judging whether or not the input signal is a voice in accordance with the comparison between the amplitude ratio and the set constant value. The discriminating step at the discriminating portion 5 will be described in detail in accordance with Fig. 2.

At first, in the sound/silence judging portion 6 for constituting the discriminating portion 5, the amplitude values of the L, R sum signals are compared with a predetermined constant value 2^{-k}. The value of the constant k is set so that the constant value may be slightly larger than the noise level at, for example, the time of silence signal. Accordingly, it is decided as a sound when the sum signal is larger as a result of comparison so as to move to the judgment in the next music comparing portion 9,while, in the reverse case, it is decided as a silence. A control signal showing a silence is fed to the signal processing portion 8 without the decision of the music/voice.

When it has been decided as a voice in the above step, the amplitude value of the L, R difference signal is compared with the multiplication result between the amplitude value of the L, R sum signal and a constant value 2^{-m} set in advance in the musical comparing portion 9 for constituting the music/voice judging portion 7. When the difference signal is larger in the comparison, it is decided as a music, and a control signal showing a music is fed to the first signal processing portion, 8 while, in the reverse case, it moves to the judgment at the next voice comparing portion 10.

The comparison computation judges whether or not the difference components of stereo acoustic signals become a certain ratio or more of the sum component. Generally in the case of the stereo music, the difference components of the L, R signals become considerably larger as compared with the case of such announce voice of news programs. The constant m is set so that the constant value 2^{-m} may become sufficiently larger than the top limit value of the ratio of the difference component with respect to the sum components in a case of the announce voice considering the noise level, resulting in that the error decision can be positively avoided when the input signals are voices, and also, they can be judged as music with high probability ratio even in the case of the music.

When they are not decided as music in the above step, the amplitude value of the L, R difference signals is compared with the multiplication results between the amplitude value of the L, R sum signals and the constant value 2^{-n} set in advance in the voice comparing portion 10. When the difference signal is small, it is decided as the voice, and the control signal showing the voice is fed to the signal processing portion 8. In the reverse case, a control signal showing a decision reservation is fed or a control signal is not transferred to the first signal processing portion 8 so as to show that positive judgment cannot be effected both about the music and voice.

The comparison computation comes to judge whether or not the different component of the stereo acoustic signal becomes a certain ratio or lower of the sum component. As described hereinabove, the difference component of L, R signals becomes considerably small as compared with that in a case of the stereo music generally in the case of the announce voice. The constant n is set so that the constant value 2^{-n} becomes near a top limit value

of a ratio of a difference component with respect to the sum component in a case of the announce voice considering the noise level so that it can be decided at a high probability ratio as voice when the input signal is a voice. When it cannot be judged as music through it is a music in the music comparing portion 9, error decision repeated as the music can be avoided at a high probability ratio.

In the decision in the music comparing portion 9 and the voice comparing portion 10, extremely stable deciding operation can be continued if the volume level of the inputted acoustic signal changes, because the amplitude ratio (1L-R1:1L+R1) between the L, R difference signal and the sum signal is used.

An embodiment of the music/voice processing apparatus of the present invention will be described hereinafter.

Fig. 3, reference numeral 11 is a second signal processing portion for effecting the signal processing upon the L/R stereo input signals to be transmitted from a signal supply. Reference numeral 12 is an effect sound generating portion for generating effective sounds such as initial reflection sound, reverberation sound and so on in accordance with the stereo inputting signals, reference numerals 13 and 14 are a first effect sound adjusting multiplier and a second effect sound adjusting multiplier for adjusting the volume of the output signals of the effect sound generating portion 12, reference numerals 15 and 16 are a L channel direct sound adjusting multiplier and a R channel direct sound adjusting multiplier for adjusting the volume of the stereo input signal, which are all inner components of the second signal processing portion 11. Reference numeral 17 is a music/voice deciding portion for deciding whether or not the input signals are music, voice or silence in accordance with the stereo input signal, outputting the decision results as control signal, reference numeral 18 is a parameter control portion which is adapted to receive the control signal outputted from the music/voice deciding portion 17 so as to effect variable control of the acoustic parameters along the decision result. In the present embodiment, as the acoustic parameters, they are the respective gains of the first effect sound adjusting multiplier 13, the second effect sound adjusting multiplier 14, the L channel direct sound adjusting multiplier 15, and the R channel direct sound adjusting multiplier 16. Reference numeral 19 is a parameter setting portion for setting in the parameter control portion 18 a most suitable value for music and a most suitable value for voice on the above described gain.

Also, in Fig. 4, reference numeral 20 is a second sound/silence deciding portion for discriminating whether or not the stereo input signal is a sound or a silence, and also, outputting control signals showing that the input signals are a silence when the signals have been decided as silence, reference numeral 21 is a music deciding portion for discriminating whether the stereo input signals are a music or not when the signals have been judged as sound in the second sound/silence deciding portion 20, outputting control signals showing the music when the signals have been discriminated as music, reference numeral 22 is a voice deciding portion for discriminating whether the stereo input signal is a voice or not when the signal has not been judged as music in the music deciding portion 21, for respectively outputting control signals showing the voice when the voice has been discriminated, a control signal showing that the decision is reserved due to difficulty in the decision of the music/voice when it has been judged as a non-voice. They are all the inner components of the music/voice deciding portion 17.

The music/voice processing apparatus in the embodiment of the present invention constructed as described hereinabove will be described hereinafter in its operation.

In Fig. 3, L/R stereo input signals are inputted to the second signal processing portion 11. Within the second signal processing portion 11, computation processing such as folding-in or filtering computation or the like is applied on stereo input signals by the effect sound generating portion 12, the effect sounds such as initial reflection sounds, reverberation sounds or the like are generated. The effect sounds are adjusted in gain by the first effect sound adjusting multiplier 13 and the second effect sound adjusting multiplier 14. The L/R stereo input signals are adjusted in gain by the L channel direct sound adjusting multiplier 15 and the R channel direct sound adjusting multiplier 16. Thereafter, they are respectively added to the effect sounds adjusted in the gain so as to output them from the second signal processing portion 11.

L/R stereo input signals are inputted even to a music/voice deciding portion 17. The interior of the music/voice deciding portion 17 is composed of the second sound/silence deciding portion 20, the music deciding portion 21, the voice deciding portion 22 as shown in Fig. 4. The decision is effected repeatedly by such a step as described in Fig. 5.

Namely, in the second sound/silence deciding portion 20, it is judged whether or not the input signal is a sound or a silence. When it is judged as a silence condition, the control signal showing the silence condition is externally outputted to return to the starting condition of the decision again for repeating the decision.

When the input signal has been judged as a sound condition, the judgment is entrusted to the next music deciding portion 21 so as to judge whether the input signal is a music or not. If the

input signal is judged as music, the control signal showing the music is externally outputted so as to return to the starting condition of the decision again for repeating the decision.

When it has been judged that the signal is not music, the judgment is entrusted to the next voice deciding portion 22 so as to judge whether or not here the input signal is a voice. If it is judged as a voice, a control signal showing the voice is externally outputted. When it has been judged as a non-voice, a control signal showing the reservation of the decision is externally outputted as whether it is music or voice cannot be discriminated at a high probability outputted ratio to respectively return to the starting condition of the decision again for repeating the decision.

Although the above described series of deciding operation is continuously repeated, it has only to be repeated, for example, for each of one or several sampling periods.

In Fig.3, the volumes of the effect sound and the direct sound from the parameter setting portion 19 in advance such as, values most suitable for music, values most suitable for voice and so on are transmitted as the most suitable acoustic parameters to the parameter control portion 18, as each gain coefficient of the first effect sound adjusting multiplier 13, the second effect sound adjusting multiplier 14 and the L channel direct sound adjusting multiplier 15 and the R channel direct sound adjusting multiplier 16.

The parameter control portion 18 receives the control signal from the music/voice deciding portion 17 so as to slightly correct the gain of each of the above described multipliers so that the volumes of the existing state of effect sounds and the direct sounds may become closer to the most suitable value to a predetermined music if it is a music. Then, if it is a voice, the above described gain is slightly corrected so that it may closer to the most suitable value. In the case of the silence condition or the decision reservation, the correction of the above described gain is not corrected.

Fig. 6 shows the algorithm shape of an embodiment of the gain correction of the above described effect sound and the direct sound in the parameter control portion 18.

In Fig. 6, the volume for effect sound use, namely, the gains of the first effect sound adjusting multiplier 13 and the second effect sound adjusting multiplier 14 are represented as b, and the volume for direct sound use, namely, the gains of the L channel direct sound adjusting multiplier 15 and the R channel direct sound adjusting multiplier 16 are represented as a. The most suitable values of the a, b in a case of the music reproduction are set in advance as A, B. The most suitable values of the a, b in a case of the voice reproduction are set in advance as (A + B), O. Also, the gains a, b set in each of the above described multipliers 13 to 16 actually are represented as shown in the following formulas;

$$a = A + d$$
$$b = B - d$$
$$(O \leq d \leq B)$$

where d takes a value between O through B, and, if it is O, it is a most suitable value of the music reproduction, if it is B, it is a most suitable value of the voice reproduction. Each value of A, B, d is considered an integer which is sufficiently larger than 1.

In Fig. 6, the input of the control signal from the music/voice decision portion 17 is waited. When the control signal is inputted and the control signal is a silence, the input of the next control signal is waited without the gain correction thereof.

If it is a music in a case of the sound, the input of the next control signal is waited without the gain correction if the d is already O. If the d is larger than O, the d is reduced by 1 so as to calculate the a, b again for setting them in each of the above described multipliers 13 to 16.

If it is a voice in a case of the sound, the input of the next control signal is waited without the gain correction if the d is already B. If the d is smaller than B, 1 is added to the d so as to calculate the a, b again for setting each of the above described multipliers 13 to 16.

When the decision is reserved without judgment of music or voice although it is a sound, the gain correction is not effected so as to wait for the input of the next control signal.

The correction of the above described gain is repeatedly carried out each time the control signals from the music/voice deciding portion 17 is transferred. If the effect sound and the direct sound volume are set for voice reproduction use for the first time in, for example, a case of music reproduction, the volume changes into the volume setting for music reproduction use in, for example, several seconds relatively and smoothly when the music starts to be reproduced.

When the case is a silence and the judgement of, music and voice is hard to effect, the volume correction is not effected. As it is gradually effect for the volume correction little by little not at one time even in the case of the error decision of the music/voice to be caused with a probability ratio, the influences of the error decision can be prevented to the minimum so that the extremely stable music reproduction can be realized. The same thing can be said even in the case of the reproduction of the voice.

In the above described embodiment, the effect

sound is generated as the treatment in the signal processing portion. Without restriction to it, it may be used as a filtering operation or the like for the tone quality adjustment. Although the acoustic parameter to be controlled is used as the volume of the effect sound and the direction volume. Without restriction to it, it may be made filter coefficient, reflection sound delay, reverberation time or the like.

Especially restriction is not added to a method of discriminating the music and the voice in the music/voice deciding portion. The control method of acoustic parameters in the parameter control portion is not restricted to a method shown in the present embodiment so far as the gradual correcting method is taken.

Also, the acoustic signals to be inputted are not restricted to stereo signals, but, for example, monoral.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be noted here that various changes and modifications will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention, they should be construed as included therein.

Claims

1. A music/voice discriminating apparatus comprising;

   an adding portion for calculating a sum between two channels L, R signals, to be inputted,

   a subtracting portion for calculating a difference between the L, R signals, and a signal processing portion for discriminating whether L, R signals are in a silence condition or in a sound condition, and whether they are in a music condition or in a voice condition when they are in the sound condition, the signal processing portion being composed of a sound/silence judging portion for judging the sound condition or silence condition in accordance with the L, R signals or calculated by the adding portion and substracting portion, and a music/voice deciding portion for judging whether the L, R signals which have been inputted in accordance with the output signal of the adding portion and the output signal of the subtracting portion are in the music condition or in the silnece condition.

2. The music/voice discriminating apparatus as defined in claim 1, wherein the sound/silence judging portion has a sound/silence comparing portion for comparing the amplitude of the L signal and the R signal or the amplitude of an output signal of the adding portion with a predetermined sound/silence judging coefficient so as to decide it as a silence when the amplitude is the predetermined sound/silence judging coefficient or less, a sound when the amplitude is more than the predetermined sound/silence judging coefficient.

3. The music/voice discriminating apparatus as defined in accordance with the claim 1, wherein the music/voice deciding portion is composed of a music comparing portion for comparing the multiplication result between the amplitude of the output signal of the adding portion and a predetermined music deciding coefficient together with the amplitude of the output signal of the subtracting portion, and a voice comparing portion for comparing a multiplication result between the amplitude of the output signal of the adding portion and a predetermined voice deciding coefficient together with the amplitude of the output signal of the subtracting portion, the music comparing portion deciding it as a music reproducing condition when the amplitude of the output signal of the subtracting portion is larger, the voice comparing portion deciding it as a voice reproducing condition when the amplitude of the output signal of the subtracting portion is smaller.

4. The music/voice discriminating apparatus as defined in either of claim 1, 2 or 3, wherein, when it has been decided as a silent in the sound/silent judging portion, the decision in the music/voice judging portion is not effected or the decision result is neglected.

5. A music/voice processing apparatus comprising;

   a first signal processing portion for effecting signal processing such as filtering, addition of initial reflection sounds and reverberation sounds, volume adjustment or the like upon inputted acoustic signals,

   a music/voice deciding portion for continuously or discretely keeping deciding whether or not an acoustic signal is a music or a voice or in a silence condition in accordance with the inputted acoustic signal,

   a second signal processing portion for variably controlling acoustic parameters for the acoustic signal processing in the first signal processing portion in accordance with the decision result of the music/voice deciding portion, a parameter setting portion for setting in the parameter controlling portion a value opti-

mum for voice in advance as the acoustic parameter value, and a value optimum for music, the existing state of acoustic parameters being corrected respectively little by little so that they may become closer to an optimum value for the music when it has been decided as music, or may become closer to a value optimum for voice when it has been decided as voice, in the parameter control portion, in accordance with the continuous or discrete decision results in the music/voice deciding portion, the existing state of acoustic parameters being not corrected when it has been decided as the silence condition and when the decision of the music/voice is hard to effect.

Fig. 1

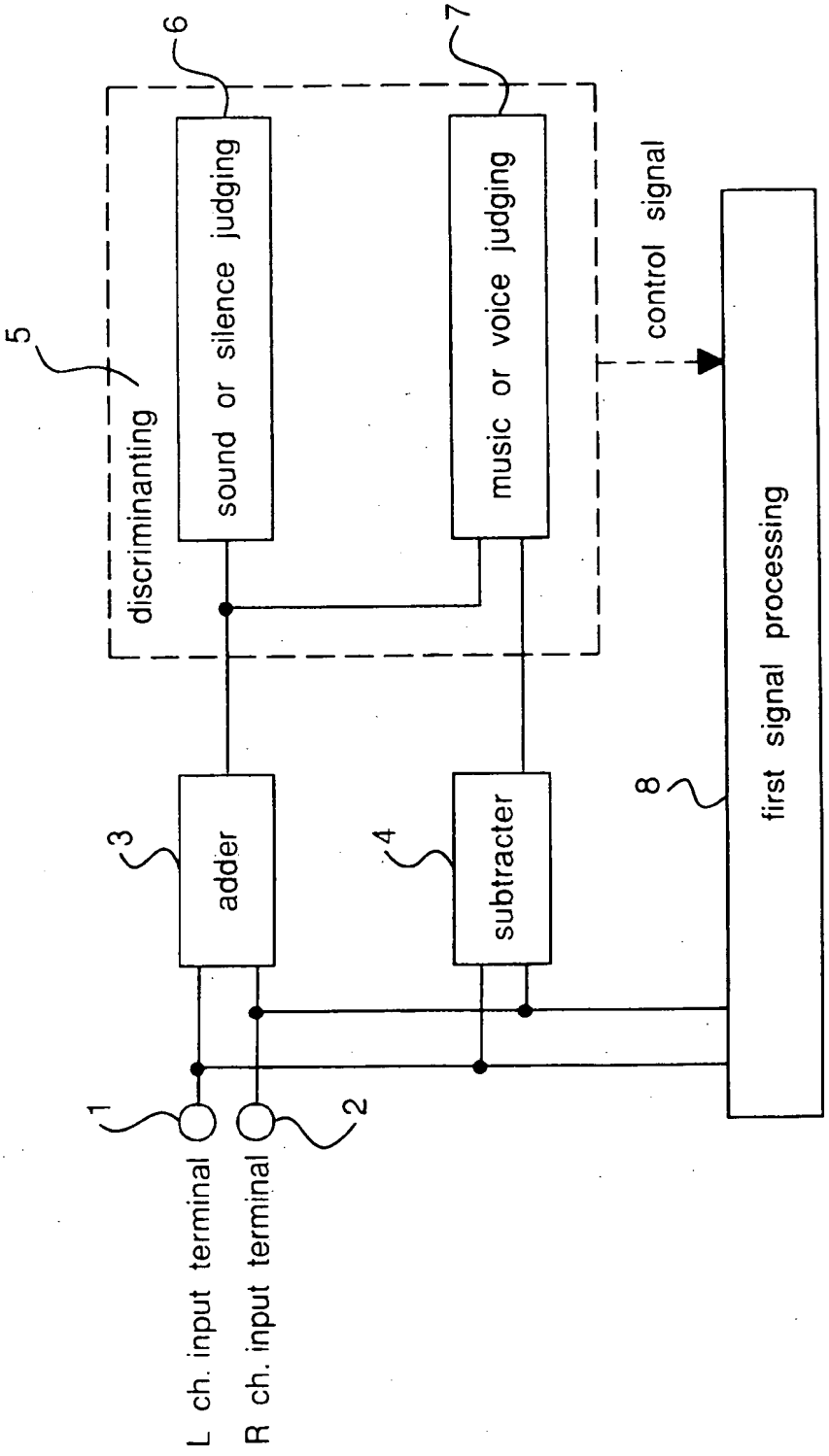
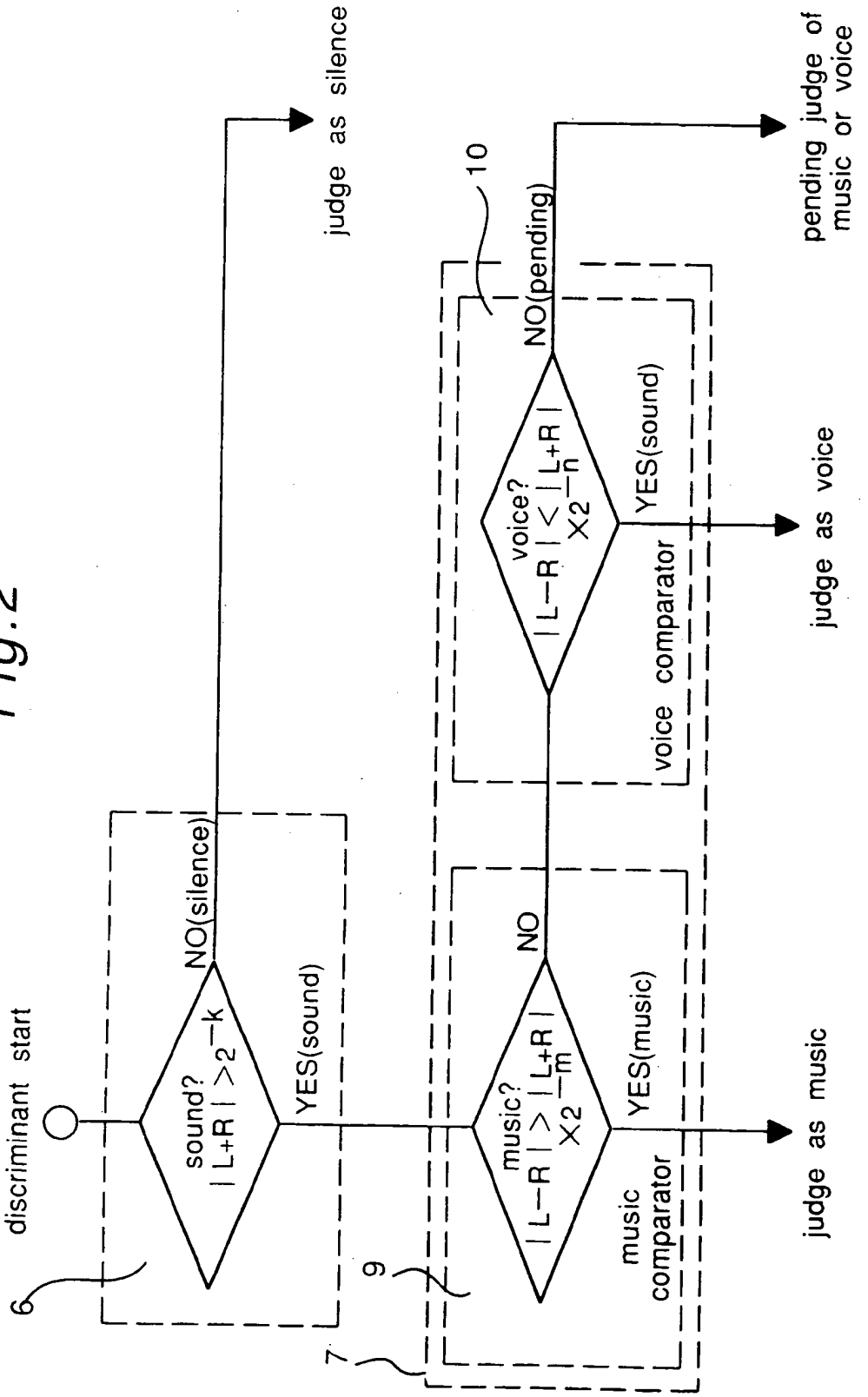

L ch. input terminal
R ch. input terminal
1
2
3
adder
4
subtracter
5
discriminanting
6
sound or silence judging
7
music or voice judging
control signal
8
first signal processing

Fig.2


discriminant start
sound?
| L+R | > 2^-k
NO(silence)
YES(sound)
judge as silence
6
9
7
music?
| L-R | > | L+R | X2^-m
NO
YES(music)
judge as music
music comparator
10
voice?
| L-R | < | L+R | X2^-n
NO(pending)
YES(sound)
judge as voice
voice comparator
pending judge of music or voice

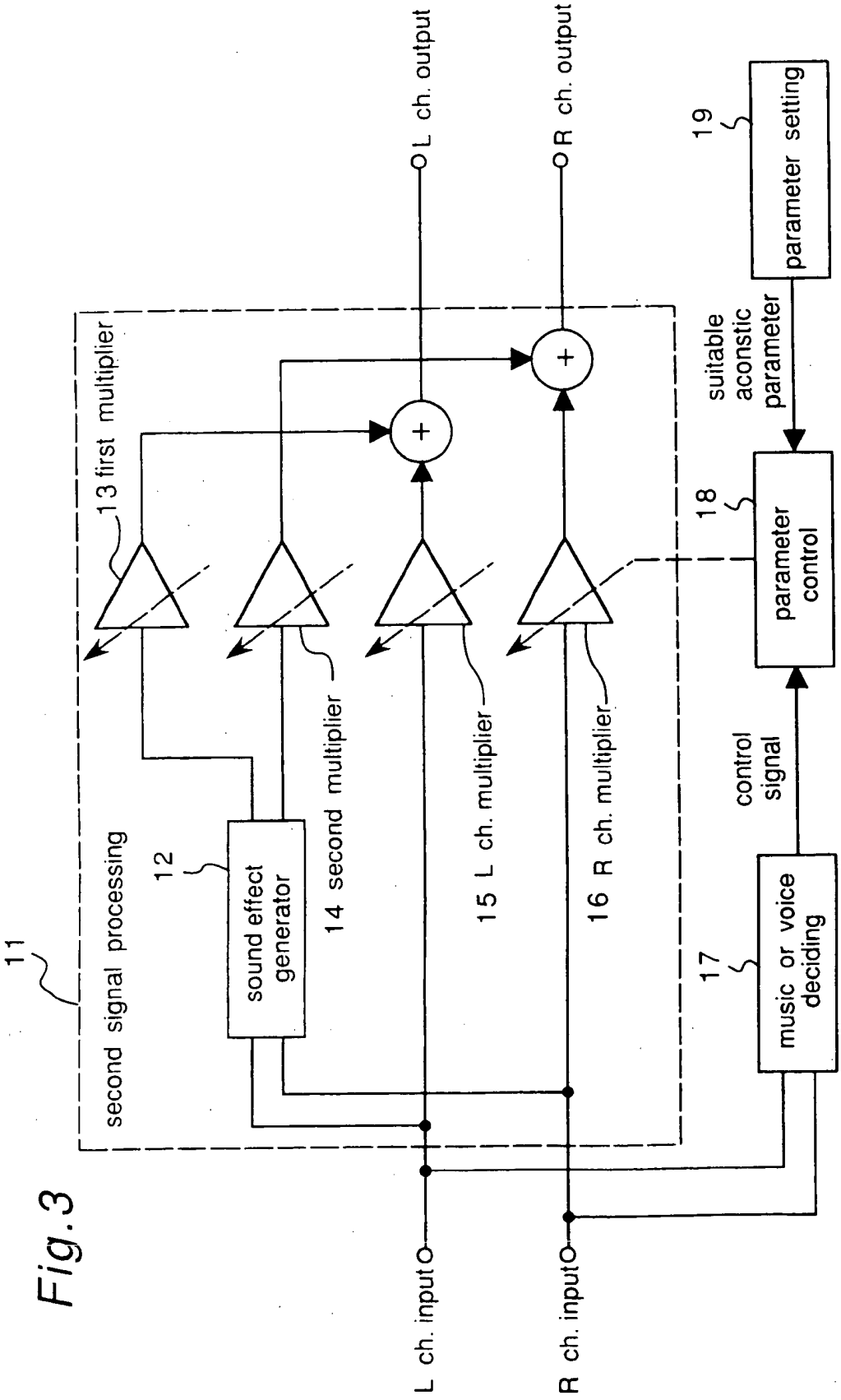

11
second signal processing
12
sound effect generator
13 first multiplier
14 second multiplier
15 L ch. multiplier
16 R ch. multiplier
17
music or voice deciding
18
parameter control
19
parameter setting
suitable aconstic parameter
control signal
L ch. input
R ch. input
L ch. output
R ch. output

Fig. 3

Fig. 4

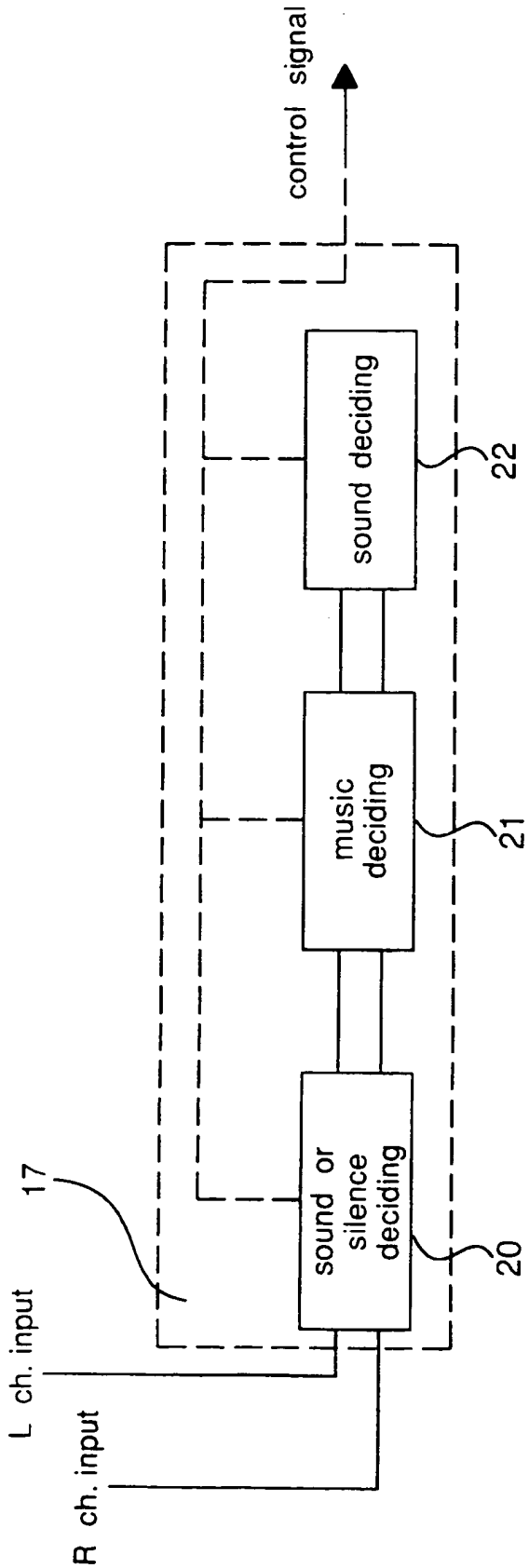

control signal
sound deciding
22
music deciding
21
sound or silence deciding
20
17
L ch. input
R ch. input

Fig.5

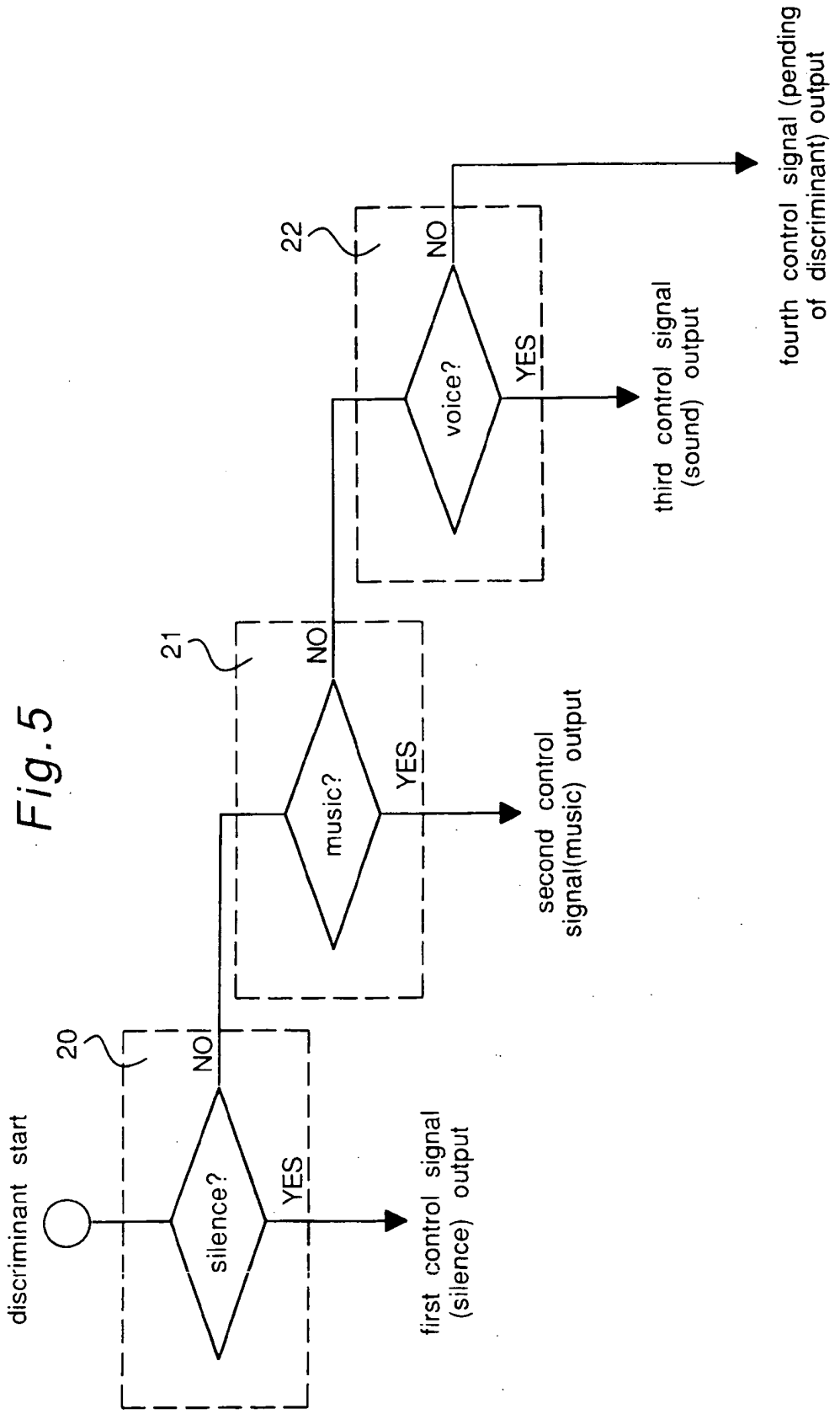
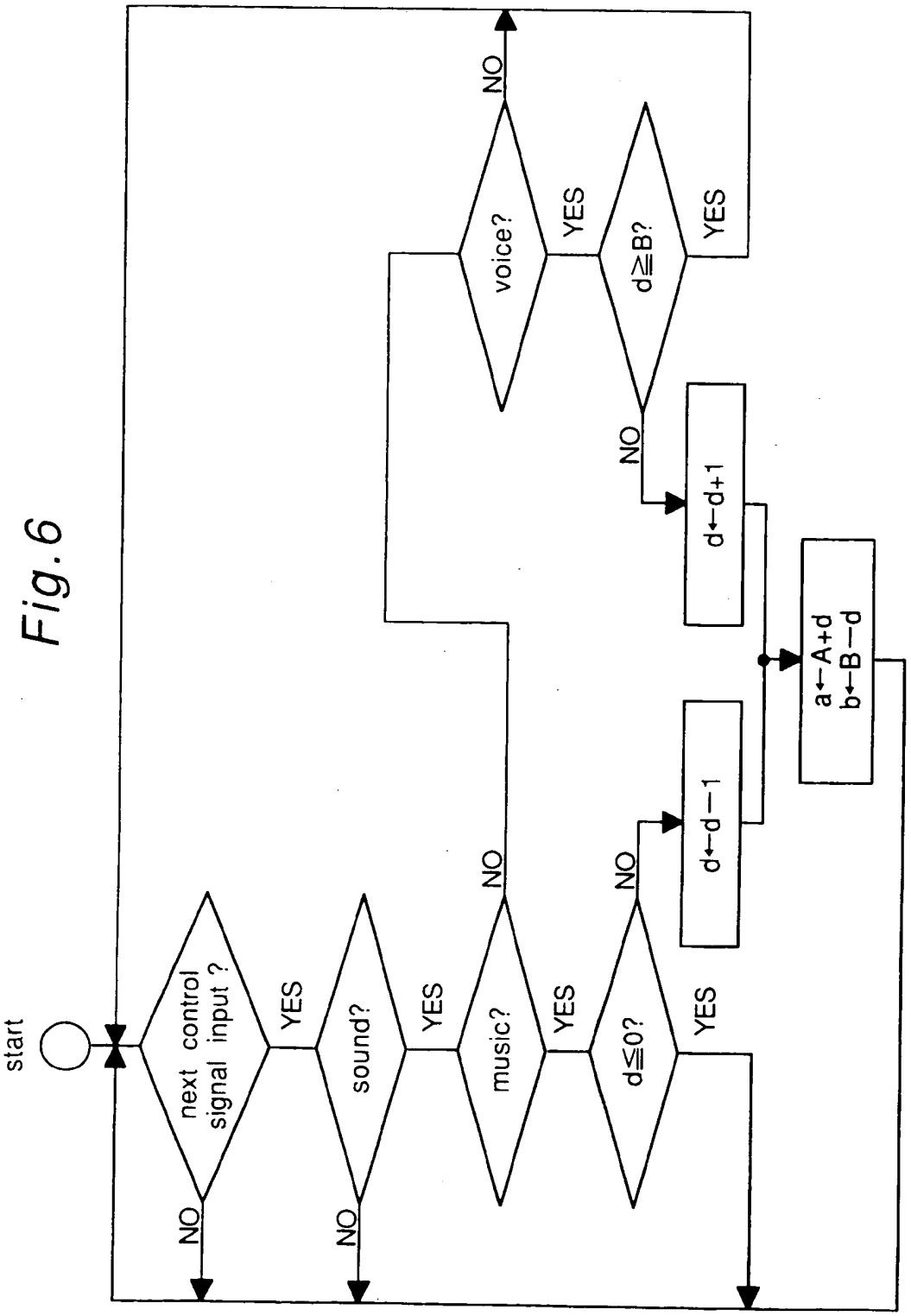

discriminant start
20
silence?
YES
NO
first control signal (silence) output
21
music?
YES
NO
second control signal(music) output
22
voice?
YES
NO
third control signal (sound) output
fourth control signal (pending of discriminant) output

Fig.6


start
next control signal input ?
YES
NO
sound?
YES
NO
music?
YES
NO
d≦0?
YES
NO
d←d−1
voice?
YES
NO
d≧B?
YES
NO
d←d+1
a←A+d
b←B−d

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 10 9511

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 439 505 (TELEDIFFUSION DE FRANCE) * page 3, line 5 - page 5, line 19; claim 1; figure 1 * ---	1,5	H04S7/00
A	FUNK-TECHNIK vol. 30, no. 6, March 1975, MUENCHEN, DE pages 129 - 130 J RATHLEV 'Neuartige Stereo-Anzeige' * the whole document * ---	1,5	
A	US-A-4 236 041 (THOMAS) -----		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

H04S

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	02 OCTOBER 1992	S J LAMBLEY

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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